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**INNOVATION AT POLISPORT: DISCOVERING THE DRIVERS AND IMPACT ON  
PERFORMANCE AT A PORTUGUESE SME**

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## **Abstract**

This case intends to study the drivers of innovation at Polisport, a Portuguese SME operating in the plastics industry for two-wheeled vehicles. This firm has won several product awards across the world and was considered in 2011 the most innovative SME in Portugal. Embodying innovation Polisport has been able to conquer international markets, transform its industry and outplay established competitors despite its smaller resources. The goal is to discover a set of relevant variables that positively affect its innovativeness and analyzing the impact of the innovation strategy on firm's performance.

*Keywords:* Innovation; SME; Portuguese; Determinants

## **Introduction**

Portugal has been going through some tough times however many Portuguese Small and Medium Enterprises (SME) are able to stand out and actually change their industries not only locally but globally. Innovation seems to make the difference since the introduction of innovative products, services, processes, or business models tailored to attractive niches is an additional opportunity for SMEs to stand out from competition (Porter, 1980). Despite of the constraints SMEs normally face they are often successful innovators achieve superior performance. Innovations are among the most important means through which small and medium sized enterprises are able to increase employment and foster economic growth therefore a lot of research has been done to determine which factors enhance the innovativeness of SMEs. These studies revealed that activities linked to innovation are correlated with a considerable number of variables however mixed findings are found regarding their effect. SMEs are normally more deeply integrated in the region in which they operate than large firms do. Therefore the determinants of innovation for SMEs depend on specificities of that region (Kaufmann and Todtling, 2002). The business structure in Portugal is clearly dominated by SMEs. According to INE, the

Portuguese Statistical Institute, SMEs represented, in 2008, 99,7% of the national business structure, are responsible for 72,5% of the total employment and produce 57,9% of the national turnover. Given the extreme importance SMEs have in Portugal is interesting to understand how SMEs may increase their innovativeness to enhance their performance.

## Theory Background

According to J.A. Keizer et Al (2002), the variables that have already been studied as potential determinants that positively affect innovation in SMEs can be divided into two different dimensions, *internal and external*.

**Table 1- Variables affecting innovativeness of SMEs (Adapted from J.A. Keizer et al., 2002)**

Internal Variables	External Variables
<p><i>Strategy</i></p> <ul style="list-style-type: none"> <li>• Explicit Strategies to increase and stimulate internal creativity and risk taking behavior (Birchall et al. 1996; Carrier, 1994)</li> <li>• Strategies to implement state-of-the art production technology and automation (Aronson 1998; Abdul Nour et al. 1999)</li> </ul> <p><i>Structure</i></p> <ul style="list-style-type: none"> <li>• Application of project management structures (Larson et al. 1991; Meer et al. 1996)</li> </ul> <p><i>Technology policy</i></p> <ul style="list-style-type: none"> <li>• Planning for the future (Docker and Stokman, 1988)</li> <li>• Number of technology policy instruments (Oerlemans et al. 1998)</li> </ul> <p><i>Level of education</i></p> <ul style="list-style-type: none"> <li>• Level of education of founder/manager and employees (Docker and Stokman, 1988)</li> <li>• Presence of qualified engineers (Le Blanc et al. 1997; Hoffman et al. 1998)</li> </ul> <p><i>Investments in R&amp;D</i></p> <ul style="list-style-type: none"> <li>• Percentage of sales volume invested in R&amp;D (Birchall et al. 1996)</li> </ul> <p><i>Geographical Location</i></p> <ul style="list-style-type: none"> <li>• Rural or urban location (Hoffman et al. 1998)</li> </ul>	<p><i>Collaboration with other firms</i></p> <ul style="list-style-type: none"> <li>• Collaboration with suppliers to overcome size constraints and to spread new technology costs and risks. Continued interactions with suppliers lead to low formalized relations that could be difficult to achieve over long distances (Lipparini and Sobrero, 1994).</li> <li>• Close working relationships with suppliers and customers in co-design and co-makership (Birchall et al. 1996; Meer et al. 1996)</li> <li>• Customers are the main source of improved technology for SMEs in the USA (Le Blanc et al. 1997)</li> <li>• Strategic alliances as an integral part of the firm's development plan (Forrest, 1990; Cooke and Wills, 1999)</li> </ul> <p><i>Linkages with knowledge centers</i></p> <ul style="list-style-type: none"> <li>• Contributions by professional consultants, university researchers and technology centers (Le Blanc et al. 1997; Hoffman et al. 1998; Oerlemans et al. 1998)</li> <li>• Contributions by innovation centers and Chambers of commerce (Oerlemans et al. 1998)</li> </ul> <p><i>Utilizing financial resources or support regulations</i></p> <ul style="list-style-type: none"> <li>• Availability of R&amp;D funding (Le Blanc et al. 1997; Birchall et al. 1996; Hoffman et al. 1998)</li> <li>• Government financial aid (Dutch Ministry of Economic Affairs, 1993)</li> </ul>

As it may be obvious *internal variables* are those that come from within the company, the characteristics and policies from SMEs. *External variables* come from the environment surrounding the

firm and the opportunities it may provide. However generalizations are difficult to get since the behavior of SMEs differs by industry and geographical location. One way to learn more about determinants of innovative efforts in SMEs is to conduct studies under diverse economic conditions and in different geographical areas (S. Radas and L. Bozic, 2009).

### *Internal Variables*

*Investments in R&D* come as one of the first studied predictors of innovation however while some found a positive relationship between the amount spent on R&D (Oerlemans et al., 1998; J.A. Keizer, 2002) others reveal that spending money in self R&D is not determinant since SMEs are just likely to innovate through links to external R&D (Birchall et al., 1996). The *level of education* of both founder/manager and employees was found to be insignificant to innovative efforts by J.A. Keizer et al. (2002) however the presence of qualified, scientists and engineers as well as a strong leadership from an highly educated founder/manager was found to be key sources of innovative effort (Le Blanc et al. 1997; Hoffman et. Al 1998). In a recent study about Portuguese technology exporters Lages et al. (2011) found *customer orientation* and *technology orientation* to be equally important in the development of exploratory innovations. On the one hand researchers consider that a deep focus on *customer orientation* may limit a firm's ability to innovate since customers are not aware of the latest technology trends (Christensen and Bower 1996). On the other hand an excessive focus on technology may lead to unsuccessful innovations either because customers are not ready yet or because they are just not well accepted in the market (Zhou, Yim and Tse 2005). A balance between both orientations is important (Zhou, Yim and Tse 2005). *Customer Orientation* consists in firm's ability to analyze, answer but also predict customer needs and new markets. On the other hand innovative firms are also technology oriented strongly investing in R&D, proactive in acquiring and developing new technologies to apply in

their new products (Kanter 1988). In particular *technology policy* has often been investigated as an innovation determinant (Wilson, Ramamurthy and Nystrom, 1999). It reflects the innovative attitude of an organization and its commitment to innovation and involves such things as recruiting technical personnel, committing funds to new technology development and building or maintaining a tradition of being at the forefront of a technological area in a particular industry Ettlie and Bridges (1983).

#### *External Variables*

SMEs have no difficulty to have access to *sources of knowledge* which are able to directly strengthen the technological competences of the SMEs and thus their competitive strength nevertheless it implies transaction costs that sometimes may outweigh the benefits (Hoffman, 1998). The impact of links to *sources of knowledge* which include contributions by professional consultants, university researchers and technology and innovation centers (Le Blanc et al., 1997; Hoffman et al., 1998; Oerlemans et al., 1998) is inconclusive. Its effect differs among sectors (Hoffman, 1998) and different geographical locations (Le Blanc, 1997) however J.A. Keizer (2002) found it to be one of the most critical factors. In fact, Portuguese SMEs have considered external sources such as external training or consultancy to be important to achieve successful innovation in processes and procedures (Birchall, 1996). *Collaboration with other firms* may also be an important driver of innovation in SMEs since the ability to glue external expertise and capabilities in an original and unique way is considered the key factor in pursuing innovative performance (A. Lipparini, M Sobrero, 1994). All firms depend upon their environment for inputs which are vital to their survival and growth since technological innovation is increasingly less the result of efforts performed by a single firm. The *utilization of financial resources and support regulations* is also viewed as a facilitator of innovation especially in SMEs. Availability of R&D funding was shown to have an important influence on innovative efforts in SMEs (Le Blanc et al.,

1997; Birchall et al., 1996; Hoffman et al., 1998). However J.A. Keizer et al. (2002) and S. Radas and L. Bozic (2009) found that collaboration subsidies and financial support regulations are not significant. This means that innovators are able to work around obstacles and do not miss the effect of innovation. The Portuguese market is really small still many SMEs look only to the domestic market as a place to sell. This may restraint innovation since literature reveals that the *exposure to international markets* may increase innovation. According to Sorescu et al. (2003) more competitive markets offer higher incentive to innovate. S. Radas and L. Bozic (2009) found that Croatian SMEs operating in wider markets are more likely to innovate both at process and product level. However the further a company goes the harder it becomes to monitor operations given the higher complexity of the supply chain, the higher number of competitors and marketing capabilities. This may consume considerable resources and restrain the pursuit of innovation.

#### *Innovation and Performance in SMEs*

Innovation is commonly seen as having a positive impact of firms' performance and more particularly in SMEs as they try to differentiate from larger companies in order to survive and gain or create new market space. Rosenbusch et al. (2011) found a positive relationship between innovation and performance of SMEs. Moreover they find that dedicating more resources in the innovation process causes process outcomes to increase performance of SMEs. Yet, innovation demands substantial resources and may overwhelm the small and resource-scarce firms (Van de Ven (1986); Vossen, 1998). Besides innovation brings risk and uncertainty (Eisenhardt and Martin, 2000) but also temporary unprofitability (Block and MacMillan, 1993) which small firms may not be able to absorb since the failure of an innovative product in may put their existence on the line (Nohria and Gulati, 1996). While

some studies found no influence (Heunks, 1998) or even a negative impact on performance (Vermeulen et al, 2005) others report a positive effect (Guo et al. 2005).

## **Methodology**

This Study is part of a master thesis in Management under the theme of Innovation and Entrepreneurship in Global Markets. The research relies on qualitative data gathered during on-site semi-structured interviews with a Marketing Department representative and the Head of the R&D department. Additional data regarding financial information and innovation efforts was provided by the CFO and the Innovation Engineer respectively. To validate the analysis accuracy a draft of the empirical part of the paper was sent to the Head of R&D Department and then discussed via email and phone.

The study will test the positive effect of the determinants suggested by J.A. Keizer (2002) on the firm's innovation capabilities and analyze the effect of exposure to international markets and strategic orientation in innovation at Polisport. Finally the study will assess the impact of innovation on the firm's performance.

## **The Case of Polisport**

Polisport is an international company based on northern Portugal which presently deals in 62 markets worldwide employing 160 workers. Totally focused on two wheels business, Polisport works for both bicycles and motorbikes as a specialized provider of plastics exporting 93% of its production. The main products for motorbikes are plastic parts for the off-road segment where it operates either as a direct supplier of major motorbike manufacturers such as KTM, BMW or Husqvarna or as a seller of aftermarket parts for the biggest players in the market including the giant Japanese companies Honda, Yamaha, Suzuki and Kawasaki. In the bicycle market, Polisport is the leading European producer of baby-seats setting the standards for the industry. The range of products in this area also includes

mudguards, water bottles, helmets and several other accessories. Besides operating as a direct supplier of OEM and selling in the aftermarket under its own brand through distributors all over the world Polisport also produces as a Private Label, where it sells for other brands/chains as Decathlon, Intersport , Sportzone or HTS an exclusive client of car baby-seats. The third channel is represented by distributors of Polisport brand all around the world. From the year 2000 up to now Polisport has systematically introduced innovative products and developed new technologies that lead the standards in the industries it competes in. In the end of 2011 the company had a respectful portfolio of Intellectual Property composed by 8 patents, 4 trademarks and 7 industrial designs. The firm has recently won several prizes (See Annex I) being awarded twice in 2008 and 2009 for Best Injection In-Mold Part and Best Durable Good by the In-Mold Decorating Association in USA thanks to the IPD technology. Already in 2012 has won two prizes in the IF Design of Hannover, whose label is recognized all over the world as a warrant of design excellence, for Best Product Design by the Guppy Baby-seat and Best Material Design by the Corky water-bottle. In 2010 it was considered the most innovative SME in Portugal by COTEC, a National Innovation System for companies, doing it by getting the highest score since the prize exists. In order to show the innovativeness of Polisport the next section presents an overview of some recent innovative products the firm has launched. More or less innovative, more molds mean more products what emphasizes Polisport policy of continuously launching new products. From 2008 to 2011 Polisport more than double its number of molds going from 77 to 252.

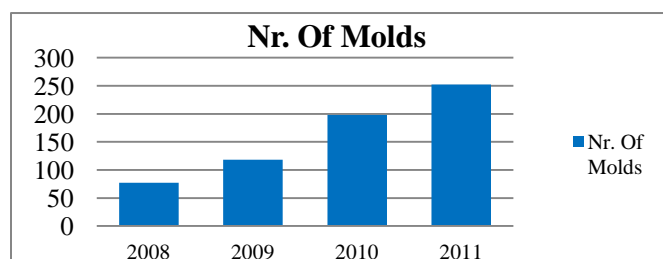


Figure I - Evolution of Nr. of Molds



## **Innovative Solutions for motorbikes**

### *The IPD Technology: “In-Mold Plastic Decoration”*

The IPD technology was born from a deep knowledge of the market and a highly advanced technology. Developed together with a firm in US during 3 years and completely self-financed the technology aimed to benefit final consumers and create value for customers mainly OEM. IPD allows to incorporate graphics into the plastic parts fusing a film through an electrical process during the injection resulting in a ready finished part. Before IPD were needed two distinct products to reach the same outcome since to be able to decorate bikes and its plastics a consumer or OEM had to invest in decals and stick them into solid colored plastics. However stickers are costly, not resistant and get easily damaged as the time and riding goes by. Besides saving the cost of stickers, in the case of consumers it saves time and skills to install them whereas for manufactures it represents considerable savings in operational costs. Moreover, has a better and long-lasting look being resistant to cracks and impacts. Since the plastics used are recyclable IPD is also eco-friendly. It is a very flexible technology that allows to quickly change between graphics and the only additional cost it implies is the film since there are no extra costs producing the mold or setting up the machine to apply the IPD film. Polisport was the first to introduce this pioneer technology in the world holding the patent. (See Annex I/II)

### *Bike Stand: “Motostand”*

The Bike Stand has been introduced in 2009 and completely revolutionized the old standard of motorbike stands. The previous standard within the market was metal and rigid stands, a burden to transport or store. Polisport’s new “Motostand” is made of plastic and totally foldable allowing better storage and easier transportation (See Annex II). This product offers unique characteristics at world level given the raw-materials it uses, the functional design and low weight. Highly resistant and recyclable it

was totally developed internally by the R&D department. This product's greater challenge was to find a material that would be light and resistant enough to be capable of holding a bike. In fact, Polisport applied a technique only used by the automobile industry which combines plastic and fiber glass and still could be matched with rubber present in the top of the stand.

### **Innovative Solutions for Bicycles**

#### *Water Bottles: "Corky" and "Biodegradable"*

Polisport has recently launched two very innovative water bottles for bicycles. The Corky is a water bottle that is made of a composite material of cork and plastic whereas the other is completely biodegradable. Both bottles were developed thinking of an increasing concern with environmental issues which is transversal to the whole value chain and in particular to the final consumer. In fact people who ride bicycles are even more concerned with environmental issues so Polisport came up with the idea of applying cork, a natural material of which Portugal is the world leading producer. Not only the bottle benefit from a higher efficiency of cork to keep temperature it gets a distinctive look, a pleasant grip and reduced weight. The "Corky" was developed together with Corticeira Amorim a Portuguese company and world leading producer of cork which added its knowledge to Polisport's expertise in plastics and molding allowing to launch an exclusive product in the world. In the same line Polisport launched a totally biodegradable bottle made from 100% natural materials that once disposed is absorbed by the environment within 6 month with no harm. Although some competitors have introduced tried to introduce "biodegradable" bottles their origin is 100% fossil. They then add a chemical which triggers the degradation still remaining on the soil and therefore not considered as biodegradable according to European standards. On the contrary, after degraded Polisport's bottle reenters in the nature cycle fertilizing the soil. To develop the product the firm counted with the cooperation of Apinat, an expert

Italian company in biodegradable plastics. The “Corky” bottle features were really appreciated and in 2012 won a prize Best Material Design at the IF Design of Hannover in whose label is recognized all over the world as a warrant of design excellence (Annex I/III).

### *“Guppy Baby-Seat”*

Polisport is the European leading producer of baby-seats for bicycles having introduced many pioneering solutions such as the ability of the chair to rotate 360 degrees to facilitate the entrance and exit of the baby, innovative fixing systems or reclining back that allows better storage and higher comfort. However Polisport was not able to be successful in one of the most representative markets for bicycle products, Netherlands. This country has a huge tradition of bicycles what makes it a really interesting and profitable market where Polisport wanted to penetrate. The Dutch is dominated by small local dealers which are very familiar with the needs of their customers. Thus Polisport collected data from one of those dealers and gathered a bunch of information that could be used to develop a new baby-seat. It actually acquired the services of a Dutch designer who was aware of the Dutch values and tastes in terms of design and functionality. The final design was inspired in modern automobile seats and allowed customers some late customization in terms of colors due to the existence of several changeable parts. This baby-seat has also won an IF award this time for Best Product Design (Appendix I/III).

### **Innovative Technology**

“Flexicolor” is a totally new process technology in the world still under development at Polisport. The majority of products are obtained by plastic injection what makes it a crucial process to the firm. However the injection machine takes long time to setup (3 hours) when the color of the plastic being injected has to be changed. This low flexibility increases the price for lower quantity orders. To solve this problem Polisport is working on the Flexicolor technology in cooperation with FEUP, a

Portuguese Engineering Faculty, which contributed theoretical studies and a German coloration liquid company. Beyond eliminating setup times the process will be much more flexible allowing to change between colors really quickly and allowing to produce lower quantities at the same price of big orders and even lowering the overall price.

## **Internal Analysis**

*“Polisport = passion + internationalization + innovation”*

It all started back in the late 70's when Pedro Araújo, a practitioner and enthusiast of off-road motorcycles decided to start the production of its own plastics. At the time getting new plastics was a challenge however Mr. Pedro Araújo faced it as an opportunity and with little resources and no experience took the risk of producing fiber glass mudguards back in his garage when he was 19. In 1982 Polisport was founded producing plastic mudguards to the Portuguese market. Having the conscience that the off-road market was not significant in Portugal Mr. Pedro Araújo soon searched for markets where the sport had a greater expression. Despite the very young age of both the company and its founder, just 2 years after its foundation the firm gave the first steps towards internationalization. Being present in the most important fairs for the business all around Europe in the early years allowed Polisport to progressively enter in European countries. International markets meant huge opportunities but also more and bigger competitors already established in the market and with lots of resources. Since the very beginning differentiation was the strategy to conquer market space through highly functional plastics and clear added value. Back then plastics were simple commodities carried out in huge plastic bags but Mr. Pedro decided to provide Polisport products through an elegant packaging and offering a wide range of colors in order to build a distinctive brand. Ever since he has been preponderant in the development of

new solutions mainly for off-road due to his deep knowledge of the market being the first in the firm to believe and commit to the innovation strategy.

### *Innovation Strategy at Polisport*

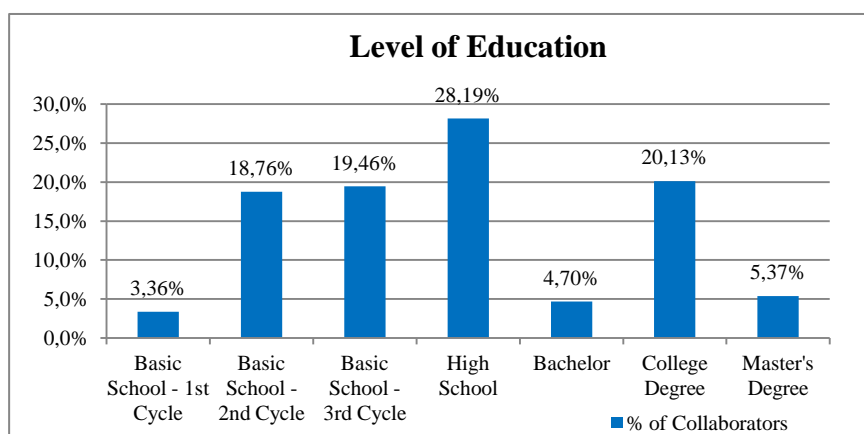
The firm has formulated, documented and diffused its innovation policy: invest in the competences of internal collaborators and technological capabilities fostering an internal culture which emphasize customer orientation, innovation and creativity, ethics, flexibility and multi-skills. It promotes innovation through continuous launch of new products, technologies and promotion campaigns but also focusing on service setting partnerships with both suppliers and customers. At Polisport innovation comes from the proximity to the market which allows a deep understanding of its needs but simultaneously from the capability to forecast technology and develop new technologies based on the most recent scientific research in its area of activity underlying a balance between customer and technology orientation. It also comes from a close interaction with its suppliers and customers facilitated by long term partnerships based on trust that help to find innovative solutions with a positive impact on each other's business as proved through the IPD technology. As a consequence, R&D project teams often involve collaborators from suppliers and customers. It is a multiple source channel that happens in logic of *open innovation* involving in the process customers, consumers, suppliers, other firms, centers of knowledge and sometimes even competitors. Such a wide network enables a transfer of know-how even from other contexts such as medicine, aerospace or electronic industries. *Crowd sourcing* is another tool to obtain new ideas, reduce the time of investigation and bring people who add clear value. For example, to launch a new range of Helmets for bicycles Polisport will count with more than 40 years of experience of an American professional with strongly proven results. Despite operating only in a B2B approach Polisport has several mechanism to hear final consumers. Through the Client Managers the

firm works together with its customers, OEM or distributors, which are closer to final and local consumers allowing to gather information that can be incorporated in new products. Consumers' satisfaction is assessed through questionnaires where the posterior processing of information allows the study of social, economic and environmental tendencies relevant to the business. In order to get even closer to consumers the firm hired a company to specifically promote Polisport in the social networks what besides promoting its image allows the firm to collect data and identify opportunities in the market, based on the collected opinions, that may lead to innovative concepts. Often Polisport is the first to introduce new products into the market being seen as a pioneer in its areas of activity. To outplay competition and sustain innovation Polisport has a strong *technology policy* supported by partnerships and outsourcing of Universities, Technology Centers and other organizations from the Scientific and Technology System. There is also a close follow up of several technology platforms such as EUMAT (European Technology Platform for Advanced Engineering Materials and Technologies), MANUFUTURE (Future Manufacturing Technologies), SusChem (European Technology Platform for Sustainable Chemistry) and CEFIC (European Chemical Industry Council). The firm has established two main goals that underline its technology orientation challenging itself to launch 5 patents per year and to match 30% of sales volume coming from R&D products with patents or registered designs. These instruments of prospection of technology tendencies allow the firm to establish itself as a pioneer developing new technologies and products that set new standards both nationally and internationally.

As mentioned before the business was born from the passion of its CEO for the sport but also from its creativity and entrepreneurial spirit. More important for Polisport was its ability to absorb and spread those values throughout the whole organization. There are many mechanisms and initiatives to develop a culture of innovation, creativity and risk-taking behavior challenging each collaborator to be a

part of the innovation journey. In 2008 was created an Idea Network aiming to involve all collaborators as well as external parties in the innovation process through their ideas for new products, processes or other items related to the organization having reached, in 2010, a participation of 53% from top managers to plant workers. To follow up the ideas there are periodic meetings where the implementation is decided by a given team according to the typology of the idea. Training programs such as Innovation and Creativity or Project Management of R&D are common and attended by all collaborators. Project Management software as well as Messenger and Skype have been extended to the whole organization to improve communication and cooperation. There is an on-line Blog with technical libraries organized by departments and frequently updated fostering the exchange of knowledge, ideas and experiences as well as to trigger the discussion about the market, new solutions and any other theme related with the organization. It has been established an integrated human resources management system that evaluates creativity and innovation at an individual but inter-departmental cooperation is also assessed. The ratio of crossed ideas between departments and the total number of presented ideas exceed 80%. Past experiences are important to learn so there is a data base about “apprehended lessons” available on the intranet providing technical, economical and commercial information to collaborators. In 2009 was created the Internal Audit department aiming among other things to run technological and innovation audits in particular in what concern to the firm ability to transform its competences into new products, services or processes as well as commercial and organizational models capable of generating added value. Finally Polisport developed an internal concept known as “Knowledge Room” where once in each trimester collaborators meet, discuss new ideas, and analyze competition, other industries and social and economical tendencies. Also very enriching is the discussion and analysis of successful case studies in all industries throughout the world, trying to learn and transfer the best practices into the firm.

The founder and CEO of Polisport, started the firm at a very young however he still managed to finish High School and even went to College to study Law which he quitted in the second year. One of Polisport's guiding values is to invest internally in the skills of its collaborators guaranteeing a diverse range of competences. As a matter of fact, 45 of its collaborators have at least a college degree of which 8 Master degrees and 24 have scientific courses including 19 engineers. More than 50% of collaborators have at least attended high school with a high presence of graduates.



**Figure II - Level of Education of Human Resources at Polisport**

### *Structures*

Polisport has its own R&D department which is divided in four main divisions, the Center of Design, the Projects Team, the Molds Team and the Specifications Team. In general the department is responsible for managing the R&D projects, generate internal knowledge, develop and maintain molds and launch new products that meet and exceed customers' needs. It is responsible for managing the industrial property, accounting for technology vigilance and prevision and managing the interfaces with key partners in the development of new products. It also maintains the System of Management of Investigation Development and Innovation NP4457/8. Polisport has actually been the first Portuguese company to be certified by TUV Rheinland regarding this norm. The Center of Design has the



preponderant role aiming to generate knowledge and develop innovative solutions both for Polisport and its Clients. Although many ideas and products are brought into the table there is a careful selection of R&D projects. There are studies of technical and financial feasibility including risk calculation algorithms. Besides, final price, time to market and potential acceptance of the market are also carefully assessed. Polisport commitment to innovation results in many new projects running at the same time what requires a proper management including a careful planning, close follow up of timings and budgets and an efficient allocation of resources. Innovation is strategically planned and set by range of product defining the technologies and solutions to develop in each case. Projects normally kick-off with an investigation study sometimes developed in partnership with other companies or sources of knowledge and taking into consideration technological tendencies, needs of the market and differentiating features that may be offered. Human resources are then allocated according to the skills the project implies. After defining all the activities the Project team become autonomous opened to the exterior namely for clients or suppliers that may be part of the team. Together with FEUP, a Portuguese Engineering Faculty, Polisport is developing specific software to enhance R&D projects management which also aims to transfer knowledge from people to the organization allowing a better flow and diffusion of information accelerating the projects and increasing its rate of success. After the development of a new solution it is assessed the patentability of the concept and decided if the industrial property must be protected. To this effect Polisport works with two national firms one in the United States. Finally the department has planned and set the goals for a 3 years base. Among some of them one may emphasize an efficient management of the Projects Portfolio, beating the competition with a lower time to market, retaining key human resources and guaranteeing the sustainability of the Center of Design giving external services of design and engineering to clients, launching new areas of products and incorporating new materials.

### *Investments in R&D*

The R&D department is maybe the most visible manifestation of the commitment to innovation representing a huge investment for the firm who could have settled as another plastics producer but instead chose to step up the game and be a reference in the industry. The department is composed by 15 people all of them with College or Mater Degrees being the heart of innovation within Polisport. The company finances this department by systematically investing a portion of its sales every year. As one may verify in the chart Polisport has been increasing its investments in R&D from roughly 1,5% of its total sales in 2007 to 5 % in 2009 and 2010. The higher investment goes to costs with personnel which reinforces policy of highly qualified collaborators mainly in the R&D department.

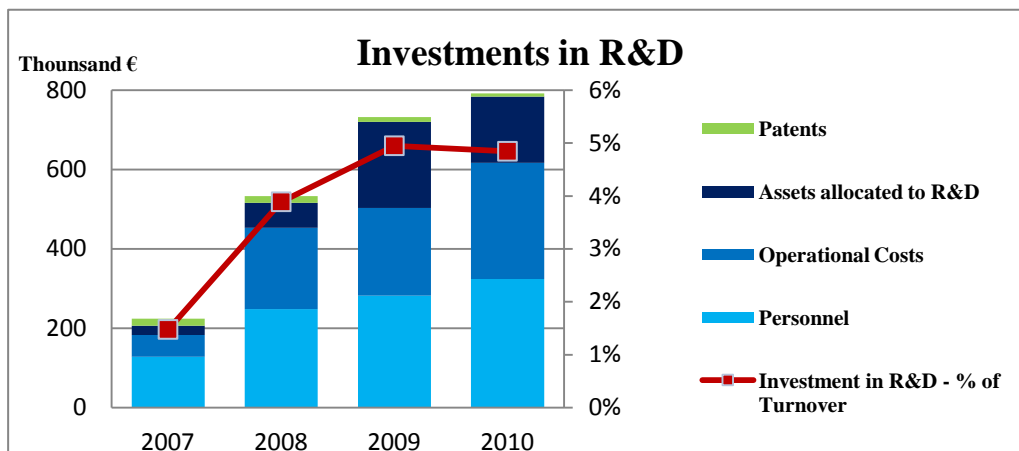


Figure III - Investments in R&D

The infrastructures and the costs of running the department also represent a considerable investment. In 2011 Polisport invested 5,5% of its turnover spending 1 million Euros in R&D which resulted in many new products launched in 2012 as the water bottles or a new protective body armor for motocross riders.

### **External Analysis**

Polisport continuously engages in diverse cooperative projects both nationally and internationally. The close relationship it establishes with its suppliers and customers allows to cooperate

in R&D activities including design, manufacturing of molds and prototyping mainly with its OEM customers. Normally the relations with other firms are made through their engineering and design departments which are more sensitive and opened to the innovative solutions that provide added value and never with purchase departments who have as primary concern the price. There are many examples where Polisport has collaborated with other firms in order to develop new innovative products such as the “Corky” water bottle developed together with the Corticeira Amorim or the 100% biodegradable bottle in cooperation with an expert Italian company in bioplastics, Apinat. There are also some products that are born through the cooperation between Polisport and its leading sponsored teams namely in the Motocross World Championship who test and give valuable insights that can be transferred to consumers. Winning the prize of most innovative SME in Portugal enabled Polisport to access a restrict cluster of multidisciplinary innovative firms with a strong potential of engaging in future innovation Projects. The firm is in permanent contact with many knowledge centers having established many partnerships with Portuguese Universities (University of Aveiro, University of Beira Interior, University of Oporto - FEUP) and also with Technology and Scientific Centers such as INEGI (Mechanical and Industrial Engineering National Institute) and the CEIIA (Center of Excellence and Innovation in the Automobile Industry). The Pole for Innovation in Polymers Engineering (PIEP) is one of the most important links since it is directly linked to the core business of the company. Currently Polisport is working with INEGI in the development of the new technology of production “Flexicolor”. It also used the link to CEIIA to incorporate an innovative material only used by Automobile Industry to develop its recent Motostand, an already successful product in the market. It is also carrying a project with FEUP developing specific software to manage its R&D projects. The certification of its Innovation System allowed the firm to spread its interfaces with other industries and entities of the Scientific and Technology System, for example, ESA (European Space Agency).

The policy at Polisport is not to wait for external financial support to trigger new products development. In fact, the majority of products are self-financed by the firm. However there are several projects that counted with the financial help of Government support programs such as QREN, for example, to develop software to manage R&D projects and new technology process, “Flexicolor”. However and emphasizing the policy of not depending on external financial supports Polisport considers that the best support regulation from government is SIFIDE. This program acts a posteriori, it means, being proven at the end of the year that a firm has invested in R&D projects it has several fiscal benefits.

### Impact on Performance

In 2010 the ROI for R&D activities was 4. The book value of its intellectual property was 2.3 million Euros in 2010 and almost 3 million in 2011. The investments in R&D and the development on innovative technologies and products under the firm brand, namely with registered patents, eases the conquering of new and prestigious clients. For instance the IPD technology opened the doors to the main OEM such as KTM, or BMW and has sold the equivalent to 1.5 million Euros in 2010.

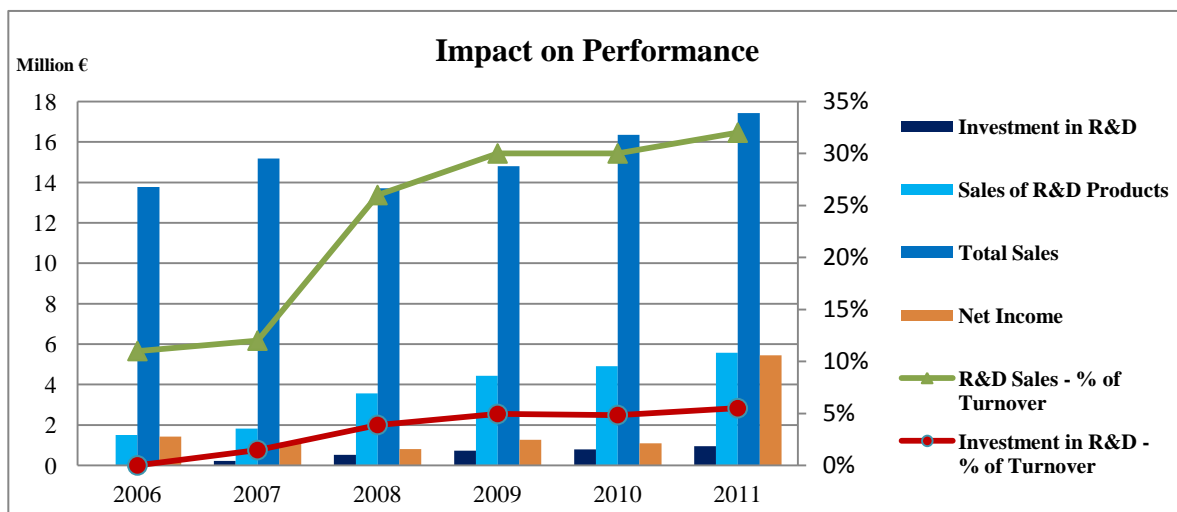


Figure IV - Analysis of innovation on firm's performance

As it is possible to identify in the chart the innovation strategy has been having a positive impact on firm's performance. As a matter of fact, Polisport sales increase have been pushed by an increase of R&D product since the later have been representing an higher percentage of total sales year after year. Moreover the increase in investments in R&D have been followed by an increase of both R&D and total sales which suggests a positively link between investments in R&D the performance of the firm. Net income has been constant around 1,5 million Euros but in 2011 reached 5,5 million, almost 40% of turnover what proves the success of the innovation strategy.

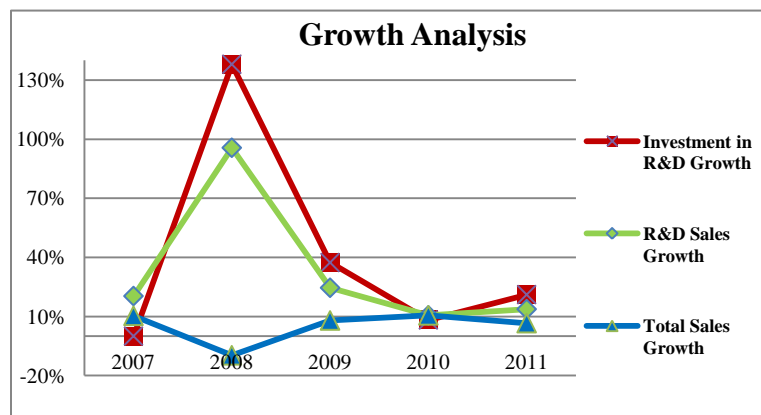


Figure V - Investment R&D and Sales Growth

Confirming the analysis above, the growth of investments in R&D is followed by an increase in R&D sales what suggests a positive relationship with the firm's performance. Apart from 2008 due to the big crisis total sales also followed the increase in R&D investments. In 2009 the growth was 8%, in 2010 11% and in 2011 7%. For 2012 the firm predicts a sales growth of 9%. R&D sales have been growing more than total sales which shows the positive impact of innovation. Polisport has some disadvantages as a higher distance to target, higher transportation costs and loss of packaging arguments as flexibility and differentiation through innovation are key to attract important customers.

## Discussion and Conclusions

The brief overview of some recent products and technologies Polisport has launched proves its ability to innovate and develop solutions that outplay competition. Moreover allowed to understand that Polisport innovative solutions emerge as a symbiosis between a deep understanding of market needs and the ability to forecast and apply the latest technologies available in the scientific community. This shows that the right balance between *customer and technology orientation* is important for the success of innovation confirming the argument of Zhou, Yim and Tse (2005). This balance seems to be a successful strategy since innovation is not just invention but also its successful commercialization. Understanding the market is important to capitalize on technology know-how and develop well accepted new solutions that increase firm's performance. The positive impact of innovation on the firm's performance is clear since R&D Sales represent already 32% of total sales and have been growing at a higher rate than the total turnover. This result confirms the findings of Rosenbush et al. (2011). Additionally the later found that dedicating more resources to the innovation process lead process outcomes to increase performance. One reaches the same conclusion since Polisport strongly invests in R&D, internal skills of its collaborators and several other mechanisms to pursuit the innovation strategy such as the outsourcing other firms and sources of knowledge or the implementation of mechanisms to foster organizational creativity. There are many initiatives that foster a strong culture of creativity and risk-taking behavior creating the proper environment to trigger innovation and continuously launch new products. For example, the "Motostand" was born form an idea in the Idea Network. Innovation and creativity training programs, the "Knowledge room" or the on-line Blog confirm that strategies to increase and stimulate creativity and risk-taking behavior are an important driver as Birchall et al 1996 and Carrier, 1994 suggested. As one may notice the level of education at Polisport is considerably high

for a SME revealing a positive relationship between the *level of education* and innovation activity in concordance with Le Blanc et al. (1997) and Hoffmann et al. (1998). The CEO has not a college or scientific degree although it does not restraint innovation since its strong leadership, commitment to innovation and deep knowledge of the market is crucial for the success of the strategy what goes against Docter and Stokman (1988) who argue that highly qualified managers are one of the determinants of innovation. *Investments in R&D* are clearly one of the innovation engines. The R&D department composed by highly skill professionals and the continuously investment of a significant portion of the total sales in R&D exponentially increased the launch of new products. Moreover one could verify that the growth of investments in R&D was followed by the increase of R&D and total sales growth suggesting a positive relationship between the investments and performance. Its strong technology policy allows Polisport to be in the forefront of scientific research allowing the firm to incorporate new technologies and materials to develop innovative solutions what confirms the findings of Oerlemans et al. (1998). An efficient allocation of resources and a close follow up of timings and budgets allow Polisport to launch products with a short time to market at a competitive price keeping the cost of R&D controlled. Through the application of project management structures Polisport is able to run many projects at the same time increasing its capability to successfully concretize and introduce in the market its innovative products and technologies. This reinforces the findings of Larson et al. 1991 and Meer et al. 1996 who suggest a positive relationship between project management structures and innovative performance. Only two years after its foundation the Polisport launched itself in the adventure of exploiting *international markets* what meant huge opportunities but also bigger challenges facing bigger and established competitors with a lot more resources which increased the firm's need for differentiation in order to gain market space. This pressure for differentiation and innovation confirms the findings of S. Radas and L. Bozic (2009) whose results revealed a positive relationship between operating in wider

markets and innovation underlying the positive effect of internationalization that is clearly present in Polisport that exports 93% of its production to 62 markets worldwide. Besides the innovative solutions seem to bring benefits in terms of performance that outweigh the increased costs of going to wider markets. At Polisport innovation is a multi-source and two way channel. From suppliers and customers to external parties such as other companies, industries or centers of knowledge all participate on Polisport's innovation process. Especially the close and long-term relationships between Polisport and its suppliers and customers enable the development of innovative solutions with positive impact in each other's businesses, as the IPD technology proves. The ability that the firm has to incorporate and combine external expertise with its own is one of the main drivers of its innovation activity and success what corroborates the proposition of Lipparini and Sobrero (1994). As seen in the case study many products and technologies involve the cooperation of external firms and sources of knowledge what emphasizes a positive effect of collaboration with other firms and links to sources of knowledge in innovative efforts (Le Blanc et al. 1997, Hoffman et al. 1998, Oerlemans 1998). The existence of financial resources and support regulations is not a driver of innovation at Polisport since the firm's policy is not to wait for any R&D funding to start new projects. In reality, the majority of new products and technologies are auto-financed by a considerable amount of its sales that has been around 5,5% of the turnover in the last three years. This result goes against the findings Le Blanc et al. 1997; Birchall et al. 1996; Hoffman et al. 1998 who found it to be a significant. During the validation of the analysis with the Head of the R&D Department all the previous results were confirmed however he emphasized the importance of results from innovation. Successful experiences with R&D products reinforce the will to keep innovating. Also very important to the Eng. Pedro Sá is the commitment of the top manager, Mr. Pedro Araújo, who is the first to believe and promote innovation. Finally he mentioned that working in



logic of open innovation involving customers, suppliers, external firms and sources of knowledge increase the firm capability to innovate.

### **Implications for Theory and Practice**

In terms of theory there is very little research about Portuguese SMEs. Since SMEs are highly affected by the environment they are involved in and innovation determinants differ by sectors and geographical locations this study is another contribution to enrich the research about the theme. Still being a case study of a single company is highly limited in terms of generalization either geographically and in scope. For practice its contributions may be higher since the study reveals many mechanisms and factors that contribute to successful innovative efforts. For managers mainly in the Portuguese context and in particular in the plastics industry, it stands out that investing in internal skills and R&D, raise the level of education, implement mechanisms to develop a culture of creativity and establish a strong technology policy positively increases the ability to innovate. Besides the application of project management structures in the innovation process helps to increase the ability to effectively introduce new products in the market. Working together with customers and suppliers as well as cooperating with other firms and sources of knowledge increase innovation capabilities through the ability to incorporate external expertise in the development of new solutions. Given positive impact of innovation in Polisport's performance makes it a strategy to be followed by managers. In particular higher investments in R&D are able to increase performance when supported by an efficient project management.

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## Annex I: Recent Product Awards

### PRODUCT AWARDS



## Annex II: Innovative Solution for Motorcycles

IPD - In-Mold Plastic Decals



Plastics + Decals



Polisport Plastic Foldable Moto Stand



Previous Standard



### Annex III: Innovative Solutions for Bicycles

Mixture of plastic and cork

**LESS PLASTIC  
FOR A BETTER  
ENVIRONMENT**

**CORK  
BOTTLES**

- Ecological and sustainable material.
- Reduction in CO2 emissions and fossil fuel usage.
- In accordance with EN 71-1,2,3 and Directive 2002-72-EC
- Soft to the touch with a natural and hypoallergenic surface.
- EFSA and FDA approval as suitable for food contact.
- In accordance with EN 71-1,2,3 and Directive 2002-72-EC.

In cooperation with  **AMORIM**  
AMORIM CORK COMPOSITES

A member of  **BIKING**  
BIKING CYCLES



Nature assimilates a bottle in less than 6 months

**REALLY GREEN  
TECHNOLOGY  
THAT WORKS**

**100%  
BIO-NATURAL**

- Material derived from renewable sources of na origins [non-fossil fuel derived].
- Fully natural plastic that behaves like traditional thermoplastics.
- Bioplastic as defined by the UNI EN 13432:2002 standard.
- Biodegradable Plastic as defined by the UNI EN 14046:2003 and ISO 14855:1999 standards.
- Reduction in the emission gases that cause the 'green-house' effect.

In cooperation with  **apinat**  
apinat

 **BIKING**  
BIKING CYCLES